

DaimlerChrysler AG

Patent claims

5 1. A tool (1) for forming a hollow section (2), characterized in that

- the tool (1) has at least one embossing punch (11) which is displaceable transversely to the longitudinal extent of the hollow section (2) and which makes an embossment on the outside of the hollow section (2) after the forming operation,
- at least one perforating punch (13) is provided in the embossing punch (11) coaxially thereto, this perforating punch (13) perforating the hollow section (2) before or 10 after the embossing operation.
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2. The tool as claimed in claim 1, characterized in that the tool (1) is also designed for cutting a flange (3) on the hollow section (2).

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3. The tool as claimed in claim 2, characterized in that the tool (1) has at least one cutting device (4) which runs parallel to the longitudinal extent, has a cutting edge (5) and is displaceable in the transverse 25 direction of the hollow section (2).

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4. The tool as claimed in claim 3, characterized in that the embossing punch (11) is arranged in such a way that it crosses and passes through the cutting device (4) in a corresponding opening (12) during the embossing operation.

5. The tool as claimed in one of claims 2 to 4, characterized in that a side (6) of the cutting device

(4) facing the hollow section (2) is designed as a shaping die wall (17), against which the hollow section (2) bears at least during the internal high pressure forming.

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6. The tool as claimed in one of claims 1 to 5, characterized in that the tool (1) has a bottom die (7) and a top die (8) which are displaceable relative to one another.

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7. The tool as claimed in claim 6, characterized in that the embossing punch (11) is mounted in a displaceable manner in or on one of the dies (7, 8).

15 8. The tool as claimed in claim 6 or 7, characterized in that

- the cutting device (4) is integrated in one of the dies (7, 8) and the cutting edge (5) forms an integral part of the respective die (7, 8), or

20 - the cutting device (4) is designed as a separate component and is fastened to one of the dies (7, 8) in a fixed position, or

- the cutting device (4) is arranged on one of the dies (7, 8) in such a way as to be adjustable in stroke.

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9. The tool as claimed in one of claims 1 to 8, characterized in that a positioning device (9) is provided which, before the cutting operation or before the forming operation, presses the hollow section (2)

30 against that side (6) of the cutting device (4) which faces the hollow section (2).

10. The tool at least as claimed in claim 3, characterized in that at least one hold-down (10), which

fixes the flange (3) of the hollow section (2) at least during the cutting operation, is provided in the region of the cutting edge (5).

5 11. A method of forming a hollow section (2) according to the internal high pressure forming process, characterized in that

- an embossing punch (11) which is displaceable transversely to the longitudinal extent of the hollow section (2) makes an embossment on the outside of the hollow section (2) after the forming operation,

- at least one perforating punch (13) arranged in the embossing punch (11) coaxially thereto perforates the hollow section (2) before or after the embossing

15 operation.

12. The method as claimed in claim 11, characterized in that a flange (3) on the hollow section (2) is cut by means of a cutting device (4) which runs parallel to the longitudinal extent of the hollow section (2) and has a cutting edge (5) which is displaced transversely to the longitudinal extent of the hollow section (2).

13. The method as claimed in claim 12, characterized in that the embossing punch (11) crosses and passes through the cutting device (4) during the embossing operation.

14. The method as claimed in claim 12 or 13, characterized in that the hollow section (2), after the cutting operation, bears during the internal high pressure forming against that side (6) of the cutting device (4) which faces the hollow section (2) and which is designed as a shaping die wall.

15. The method as claimed in one of claims 11 to 14, characterized in that, before the cutting operation or before the forming operation, a positioning device (9) presses the hollow section (2) against that side (6) of
5 the cutting device (4) which faces the hollow section (2).

16. The method at least as claimed in claim 12, characterized in that at least one hold-down (10) arranged in the region of the cutting edge (5) fixes the flange (3) of the hollow section (2) at least during the cutting operation.

17. The method at least as claimed in claim 12, characterized in that the flange (3) is cut by closing the tool (1).